

R marks

Applicant respectfully requests reconsideration of this Application as amended herein.

The Examiner has asserted that the declaration is defective because it “does not identify the mailing or post office address of each inventor.” In fact, the declaration filed with this application does identify the mailing address of the sole inventor of this application. In the first line of the declaration, the inventor declares that “I hereby declare that my residence, **post office address** and citizenship are as stated below next to my name...” Applicant does not understand what is defective about this declaration. Applicant respectfully requests that the Examiner explain specifically what he believes to be defective with this declaration since it appears to Applicant that it is sufficient on its face.

The Examiner has made the Restriction Requirement final. Applicant is preparing a Petition to the Commissioner under Rule 144 to review the requirement. However, the period for response to the outstanding Office Action demands attention to this Response first, but the Examiner may wish to await action on Applicant’s Rule 144 Petition before taking action on this Response to avoid the possibility of duplicate or fractured effort.

Claims 1, 2, 5-7 and 13-17 have been rejected under 35 USC 102 as anticipated by Uchiyama. Uchiyama discloses a permanent magnet electric generator having a rotor 4 driven by an engine around a fixed stator 11. The rotor 4 has a hub 6 extending through a central bore in the stator 11, and a yoke 5 surrounding the outer radial surface of the stator 11. The yoke 5 has permanent magnets 8 alternating circumferentially with iron poles 9 in a smooth (no protrusions) cylindrical array.

Claim 1 calls for

a rotatable member mounted on bearings for rotation about an axis, said member including a flywheel rotor with a hollow center and an inwardly facing radial surface **forming a plurality of protrusions extending radially inwardly**.

The Examiner states that Uchiyama’s rotor has an inwardly facing radial surface forming “a plurality of protrusions (9) extending radially inwardly. Uchiyama’s

generator does indeed have a rotor with an inwardly facing radial surface, but it does not have protrusions on that inner surface; it is perfectly smooth. The magnets 8 and the poles 9 are flush and form a smooth cylindrical surface without protrusions. Uchiyama does have protrusions, but they are on the stator 11, not on the rotor, as in Applicant's invention defined in claim 1. Hence, Uchiyama does not anticipate claim 1.

Applicant's inductor alternator flywheel system, as defined in claim 1, uses air core armature windings located in an airgap instead of in slots in the stator as in Uchiyama. This increases the airgap distance and reduces the power capability, but increases efficiency by reducing the magnetic losses and large eddy current and hysteresis losses that would be induce in a slotted rotor such as Uchiyama's. This feature is specifically claimed in claim 1 as follows:

at least one cylinder having an outer radial surface, said cylinder being mounted concentric with respect to said rotor and **spaced apart radially from said protrusions such that an armature air gap is formed between said protrusions and said outer surface**, said cylinder being constructed of substantially high permeability material; and

at least one armature coil **mounted within said air gap** such that said flux induces an alternating voltage in said armature coil when said rotor rotates about said axis.

Thus, Applicant submits that claim 1 and dependent claims 2, 5-7 and 13-17 are not anticipated by Uchiyama.

Claims 8-10 have been rejected under 35 USC 103 as unpatentable over Uchiyama in view of Tanaka. Tanaka discloses a flywheel power source device having an iron core stator 16, and the flywheel 3 has a "squirrel-cage" rotor 19. The Examiner states that Tanaka shows a "liner 17 constructed from multiple axial layers that reduce eddy currents in said intrusions for the purpose of reducing heat." Applicant is unable to find anything in Tanaka saying that the iron core 17 is "constructed from multiple axial layers that reduce eddy currents in said intrusions for the purpose of reducing heat." It is apparent that the surface shading or other marks in Tanaka's drawings are in the form of parallel horizontal lines, but that appears to be merely surface shading lines rather than a disclosure of "multiple axial layers that reduce eddy currents in said intrusions for the purpose of reducing heat." Moreover, there is nothing in Tanaka that Applicant can find that would constitute a disclosure of "intrusions" or --protrusions--(as

amended). Applicant respectfully requests that the Examiner point out where in Tanaka he finds a disclosure of “multiple axial layers that reduce eddy currents in said intrusions for the purpose of reducing heat.”

The Examiner states that “Uchiyama and Tanaka are all from the same field of endeavor”. Applicant respectfully disagrees. Uchiyama is an electric generator for a motorcycle. Tanaka is a flywheel energy storage device that is installed in a fixed location using bearings that do not require precise leveling. Uchiyama’s device does not store energy, and Tanaka’s device is utterly unsuitable for use in a motorcycle. The problems that these two disclosure were addressing were completely different, and the solutions that they developed for the problems they addressed were of no value to each other’s application. Applicant believes that the only conceivable reason that they would be considered together would be to try to show that Applicant’s claim 8 is unpatentable.

Claim 10 specifies that the liner has a lower maximum hoop direction stress than the flywheel rotor hollow portion when the flywheel rotor is rotating at normal operating speed. Applicant does not find this disclosure in Tanaka. Hence, claim 10 would appear to patentable over the cited references independently of the patentability of claims 1 and 8.

Claims 11 and 12 have been rejected under 35 USC 103 as unpatentable over Uchiyama in view of Murakami. Murakami discloses a magnetic bearing for a flywheel assembly used for attitude control of an artificial satellite. Murakami’s bearing is primarily an active radial bearing but also provide some passive axial functionality. Since the bearing is designed for a flywheel to be used in space, the axial demands on the passive axial bearing are very slight. Uchiyama’s bearing requirements, on the other hand, are much, much different. The rotor of Uchiyama’s generator must withstand extreme accelerations due to rapid changes in direction and speed that are typical of the operation of a motorcycle. The mechanical roller or ball bearings used by Uchiyama are most suitable for such applications because of their low cost, their load carrying capacity, and their ability to withstand impact loads. Magnetic bearings, on the other hand, are most suitable for very high speed applications, and in low pressure or vacuum environments such as space or vacuum enclosures used in flywheel energy storage systems. The combination of Murakami’s magnetic bearing with Uchiyama’s

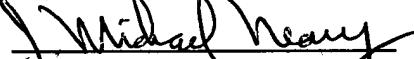
motorcycle generator is one that would never occur to a person of ordinary skill in the art in any technical context other than an obviousness rejection by a patent examiner assembling diverse references having elements that the examiner needs to reject a patent claim.

Claims 11and 12 call for a pair of upper and lower mechanical bearings for providing rotational support of the rotor, and an electromagnet mounted with respect to the flywheel rotor such that the electromagnet, when energized, lifts a majority of the weight of the flywheel rotor from the mechanical bearings. Even if Murakami's bearings were somehow used to support Uchiyama's rotor, the combination would still not meet the limitations of claim 11 because Murakami's magnetic bearing is not designed to lift the weight of the flywheel off the bearings because those are touch-down bearing that are not even intended to be in operation except when the magnetic bearings have failed to carry the load, and by definition the magnetic bearings are not carrying the load when they have failed to carry the load.

Claim 18 has been rejected under 35 USC 103 as unpatentable over Uchiyama in view of Hull. Hull discloses a superconducting bearing for use in a flywheel energy storage system for utilities. Claim 18 specifies that the central shaft is constructed of substantially high permeability material. Hull's superconducting bearing is entirely different from Uchiyama's permanent magnet generator and there does not seem to be any obvious way that the teachings of a superconducting bearing could be incorporated into a motorcycle generator to achieve the benefits taught by Hull. Applicant does not believe that a person of ordinary skill in the art in motorcycle generators would look in the superconducting bearing art for any teachings that would be relevant to the problems that he was facing. Accordingly, Applicant believes that claim 18 should be allowable over the combination of Uchiyama and Hull.

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Respectfully submitted,



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